

Application Serial No. 10/536,601
Reply to office action of March 12, 2008

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PATENT
Docket: CU-4232

Amendments To The Claims

The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

Listing of claims:

1. **(currently amended)** In an apparatus for analyzing orbit and attitude data of a low-earth orbit satellite to establish a task schedule, and generating a satellite command, a low earth orbit satellite command planning apparatus comprising:

a satellite event predictor for predicting various events related to the satellite;

a satellite task schedule planner for referring to the **[[event]] predicted various events and to inputted satellite tasks** to schedule ~~a task schedule of the satellite,~~
~~and establishing~~ a satellite task schedule;

a satellite telecommand planner for generating a set of telecommand data to be executed by the satellite according to the satellite task schedule established by the satellite task schedule planner; and

a mapping rule applier including a plurality of mapping rules applied to the respective **inputted satellite tasks** ~~task schedules~~ of the satellite.

2. **(currently amended)** The apparatus of claim 1, wherein ~~the respective satellite tasks of~~ the satellite task schedule established by the satellite task schedule planner include an ID, an execution time, and a parameter, and the satellite telecommand planner compares the parameter condition with mapping rules of the mapping rule applier, and automatically generates a set of satellite commands corresponding to the mapping rules matched with the condition.

Application Serial No. 10/536,601
Reply to office action of March 12, 2008

PATENT
Docket: CU-4232

3. (original) The apparatus of claim 1, further comprising a first user interface for establishing the mapping rules, and wherein the first user interface comprises:
- a list display for displaying a mapping rule list;
 - an information display for a mapping rule name, a task name to which the mapping rule is applied, and a relative time command sequence; and
 - a condition display for displaying a mapping condition according to a parameter of the task, and the mapping condition includes a plurality of logical operation conditions and comparison conditions.
4. (original) The apparatus of claim 3, wherein the logical operation conditions and comparison conditions include a logical product (AND), a logical sum (OR), an equal sign (=), a greater than sign (>), and a less than sign (<).
5. (original) The apparatus of claim 3, further comprising a second user interface for defining the relative time command sequence and wherein the second user interface comprises:
- a list display for displaying a relative time command sequence list;
 - a command display for displaying a list of commands that can be added to a name of the relative time command sequence; and
 - a command sequence display for displaying a set of commands included in the name of the relative time command sequence; and
- wherein the second user interface selects the command included in the

Application Serial No. 10/536,601
Reply to office action of March 12, 2008

PATENT
Docket: CU-4232

command display and edits a command set sequence of the command sequence display.

6. **(currently amended)** A satellite command planning method for a satellite control system to generate a satellite ~~command~~ telecommand from a satellite task schedule, comprising:

predicting, using a task analysis and planning system (TAPS), various satellite events; [(a)]

comparing, using the TAPS, a satellite task included in a plurality of satellite task schedules with a predefined mapping rule when the satellite task schedules are input into the TAPS; [(b)]

generating, using the TAPS, a set of commands defined by a corresponding mapping rule when the mapping rule corresponding to a condition of the satellite task is found after the comparison, and comparing a next satellite task with a next mapping rule when no mapping rule corresponding to the satellite task is found; ~~(c)~~ generating

planning, using the TAPS, a preliminary satellite command plan based on the predicted various satellite events and the generated set of satellite commands; and [(d)]

inserting, using the TAPS, a satellite command indicator additionally needed for the satellite command from the preliminary satellite command plan, and generating to establish a finalized a final command telecommand plan.

7. **(currently amended)** The method of claim 6, wherein a single mapping rule

Application Serial No. 10/536,601
Reply to office action of March 12, 2008

PATENT
Docket: CU-4232

includes a plurality of sets of satellite commands in the generating step, the generating step (b), and (b) comprises selecting a single set of satellite commands corresponding to a parameter of the satellite task from among the sets of satellite commands.

8. **(currently amended)** In a control system for monitoring and controlling a low earth orbit satellite, a LEO (low earth orbit) satellite control system comprising:

an antenna for executing radio communication with the satellite;

a satellite operating system for receiving a telemetric signal of the satellite, processing and analyzing the signal, and transmitting a telecommand signal to the satellite through the antenna;

a task analysis and planning system (TAPS) for analyzing orbit and attitude data of the satellite, for predicting various satellite events, and for inputting satellite task schedules to establish a finalized telecommand plan by a task schedule, and applying a plurality of mapping rules according to the established task schedule to generate a set of telecommand data; and

an interface for transmitting and receiving data between the systems.

9. **(currently amended)** The LEO satellite control system of claim 8, wherein the ~~task analysis and planning system~~ TAPS comprises:

a satellite event predictor for predicting various events related to the satellite;

a satellite task schedule planner for referring to the [[event]] predicted various events and to inputted satellite tasks to schedule a ~~task schedule of the satellite,~~

Application Serial No. 10/536,601
Reply to office action of March 12, 2008

PATENT
Docket: CU-4232

~~and establishing a~~ satellite task schedule;

a satellite telecommand planner for generating a set of telecommand data to be executed by the satellite according to the satellite task schedule established by the satellite task schedule planner; and

a mapping rule applier including a plurality of mapping rules applied to the respective inputted satellite tasks ~~task schedules~~ of the satellite.

10. (currently amended) The LEO satellite control system of claim 8, wherein the satellite operating system comprises:

a signal transmit/receive converter for receiving a telemetric signal of the satellite and transmitting a telecommand signal, corresponding to the finalized telecommand plan, to the satellite through the antenna;

a satellite telesurveillance unit for processing and analyzing the telemetric signal received from the satellite to monitor the states of the satellite; and

a satellite telecommand transmitter for transmitting a control command required for the satellite.

11. (new) The method of claim 6 further comprising sending through an ethernet the telecommand plan to a satellite operating system (SOS).

12. (new) The method of claim 11 further comprising transmittting the telecommand plan to a Low Earth Orbit (LEO) satellite.

Application Serial No. 10/536,601
Reply to office action of March 12, 2008

PATENT
Docket: CU-4232

13. (new) The method of claim 6 wherein the predicting step is performed with a satellite event predictor of the TAPS.

14. (new) The method of claim 6 wherein the generating step is performed with a satellite task schedule planner of the TAPS.

15. The method of claim 6 wherein the planning step is performed with a satellite telecommand planner of the TAPS.

16. The method of claim 6 wherein the inserting step is performed with a satellite telecommand planner of the TAPS.